

RISK ADJUSTMENT MODELS

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Basics of Risk Adjustment

- Prior to 2000, Medicare capitation payments were adjusted using demographic factors only

male, age 75-79 => 1.07

- Under risk adjustment, demographic factors are supplemented with health status factors

male, age 75-79 with:

no admissions => .91

kidney infection => 2.08

lung cancer => 4.14

Need for Risk Adjustment

- Improve accuracy and fairness of payments
- Promote competition based on efficiency and quality, rather than avoiding risk
- Improve incentives to enroll and manage the care of less healthy beneficiaries

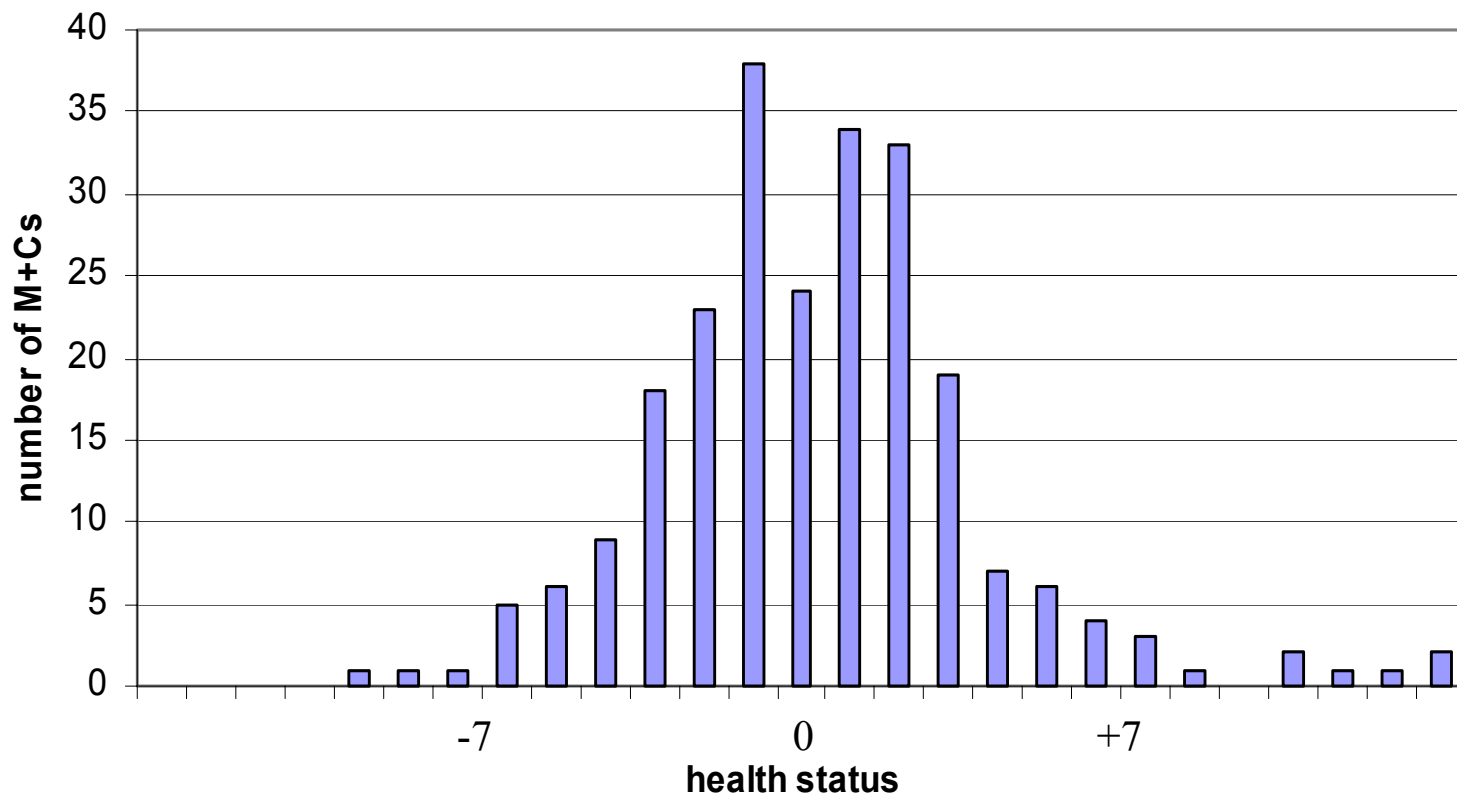
Risk Adjustment Approach

- Prospective model—i.e., using base year data to predict the following year's payment
- Payment determined by each enrollee's risk factor
- Initially based on inpatient data using PIP-DCG adjuster
- Move to risk adjustment models using inpatient and ambulatory data by 2004

Inpatient Model as a First Step

- Inpatient model risk adjusts fewer beneficiaries
 - 18.6% of beneficiaries are hospitalized
 - 10-12% are placed in PIPDCGs
 - 20% of dollars are associated with PIPDCGs
- “All significant diseases” models using inpatient and ambulatory data have greater impact
 - 80% of beneficiaries have an encounter with the health care system
 - 50-60% of dollars are associated with the significant diseases

Distribution of Avg. Health Status



Health status adjustments for plans based on the PIPDCG model vary from the average by plus or minus 7 percent.

Elements of All Significant Disease Models

- Prospective
 - inpatient, physician and outpatient diagnoses from a base year are used to assign person-specific risk factors for the next year
- Clinical classification algorithms are used; some more elaborate than others
- More diagnoses generally yield higher payments
- Models include demographic factors

Risk Adjustment Options to Reduce Data Collection Burden

- Risk models do not increase payments for all reported diagnoses
 - Collect only those diagnoses that are significant
- Consider models based on a vastly reduced number of diagnoses collected in ambulatory sites

Alternative Approaches to Model Development

- Site neutral approaches:
 - All significant diseases (e.g. 100 conditions)
 - Selected significant diseases (e.g. 6 or 25 conditions)

Alternative Approaches to Model Development (cont'd)

- All inpatient plus approaches:
 - All inpatient significant diseases plus selected significant ambulatory diseases
 - PIP plus selected significant ambulatory diseases

All Significant Diseases Approach

- Pros
 - most developed approach
 - developers included all diseases considered clinically and statistically significant
 - accuracy is good for a broad spectrum of enrollee groups and diseases
 - site of service neutral
- Cons
 - requires broadest submission of diagnoses from ambulatory settings

Selected Significant Diseases

- Pros
 - good for a narrow spectrum of diseases
 - may be less ambulatory data intensive
 - neutral to the site of care
- Cons
 - weaker explanatory power for other diseases
 - raises debate over diseases in model

All Inpatient Plus Approach

- Pros
 - models are most accurate for the 10-12% of enrollees who are hospitalized
 - accurate for the selected ambulatory conditions
 - may be less burden for ambulatory data
- Cons
 - less accurate for omitted conditions
 - raises debate over diseases not in model
 - amount depends on enrollee's treatment setting for many diagnoses
 - incentives to hospitalize; raises one day stay issue

Risk Adjuster Approaches

Additive Model

$$\begin{aligned}\text{Predicted cost} = & \$_1 \text{ (Male 65-69)} \\ & + \$_2 \text{ (Medicaid)} \\ & + \dots \\ & + \$_7 \text{ (Condition 1)} \\ & + \$_8 \text{ (Condition 2)} \\ & + \$_9 \text{ (Condition 3)} + \dots\end{aligned}$$

In addition to demographic factors, an incremental payment is associated with each significant disease.

Risk Adjuster Approaches (cont'd)

Person Categorical Model

$\$_1$ (no significant conditions); OR

$\$_2$ (up to 3 minor acute conditions); OR

$\$_3$ (1 major chronic condition); OR ...

In addition to demographic factors, a person is assigned to a single health category based on a cluster of conditions.

Risk Adjuster Models

- Hierarchical Condition Category (HCCs)
- Chronic Illness and Disability Payment System (CDPS)
- Ambulatory Diagnostic Group - Hospital Dominant (ADG-HOSDOM)
- Clinically Detailed Risk Information System for Costs (CD-RISC)
- Clinical Risk Groups (CRGs)

More Inclusive Models Have Lower Demographic Factors

(more dollars are attached to conditions)

<u>Female</u>	<u>Number of Conditions in Model</u>		
	<u>6</u>	<u>25</u>	<u>100</u>
65-69	\$2000	\$1600	\$1200
75-79	\$3300	\$2600	\$2200
85-89	\$4800	\$3800	\$3300

Example of Total Payment Under Various Models When Multiple Conditions Are Present

<u>Conditions present</u>	<u>Number of Conditions in Model</u>		
	6	25	100
Female, age 76	\$3300	\$2600	\$2200
Heart Failure	\$5200	\$3200	\$1800
Immunity Disorders		\$4900	\$3600
Opportunistic Infections			\$4100
Hip Fracture			\$1100
Total	\$8500	\$10700	\$12800

Explanatory Power

	<u>R-squared</u>
• Site neutral approaches	
– 100 significant diseases	.115
– 25 significant diseases	.100
– 6 significant diseases	.072
• Inpatient plus approaches	
– PIP	.064
• plus 25 selected diseases	.105
– All inpatient significant diseases	.085
• plus 25 selected diseases	.103

Accuracy of Model Approaches

Predictive Ratios (\$predicted/\$actual)

Disease Groups	<u>Number of Conditions</u>			
	PIP	6	25	100
– Heart Failure	.72	.96	.97	.97
– Acute Myocardial Infarction	.78	.76	.96	.98
– Hip Fracture	.83	.73	.85	.99
– Alcohol/Drug Dependence	.74	.56	.74	.97

Bold indicates inclusion in the model.

Risk Adjuster Approaches

Predictive Ratios (\$predicted/\$actual)

Base Year Group	PIP	Number of Conditions		
		6	25	100
expenditure quintiles				
lowest	2.10	1.85	1.47	1.23
middle	1.11	1.23	1.16	1.14
highest	0.75	0.69	0.80	0.86
0 hospital stay	1.07	1.15	1.07	1.03
1 hospital stay	1.01	0.87	0.97	1.02

Current Status of Model Development

- Staff has estimated several versions of each type of approach
- We are getting in-house and external clinical input into diseases that are best candidates for selected significant disease models
- Model developers are looking at variations of existing models

Selecting a Model

- Conceptual: Does the model make sense to clinicians, providers, and plans?
- Comparative analytic performance:
 - accuracy in predicting individual expenditures
 - accuracy in predicting for biased groups
- Incentives and appropriateness for payment applications
 - concerns about omitted diagnoses
 - site of service payment differences
- Data burden